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Studies on the synthesis, characterization, and chemical behavior of pyrazaboles, semi-pyrazaboles, poly(1-pyrazolyl)borates, boroxins, diboroxanes, and borazines have been performed.

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Studies on Macromolecules Derived from Pyrazolylboron and Related Boron-Nitrogen Species

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October 1991

Studies on Macromolecules Derived from Pyrazolylboron and Related Boron-Nitrogen Species

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SUMMARY OF RESULTS*

Several pathways for the synthesis and chemical modification of pyrazaboles, which are characterized by the general framework $B(\mu\text{-}pz)_2B$ (where Hpz = pyrazole) and contain a central B_2N_4 heterocycle, have been developed [1–3, 5, 9, 11–14, 17–19, 22, 27, 28, 30]. Besides normal pyrazaboles [1–3, 5, 14, 19, 22, 27], triply bridged derivatives [9, 11–13, 18], polynuclear materials with repeating $B(\mu\text{-}pz)_2$ units [7, 17], and semi–pyrazaboles [12, 22] have been prepared and characterized, including a series of X–ray crystal structure determinations [2, 4, 12–14, 17, 18, 31]. Various polynuclear materials containing $B(\mu\ pz)_nM$ units (M = metal) [10, 17] and poly(1–pyrazolyl)borates [5, 8, 10, 20, 27, 28, 30, 32] have also been studied. Some corresponding derivatives of azoles other than pyrazole have been investigated [24, 29, 31], highlighted by the preparation and characterization of a novel porphine–analogue containing a B_4N_{12} heterocycle [24]. Theoretical studies on selected species have been performed [6, 31]. Studies on boroxins have been concerned with structural aspects [15] and on base adducts of boroxins with hydrazines [16] and ethylenediamines [23], as well as the reaction of boroxins with pyrazole [11, 13]. In addition, some chemistry of diboroxanes has been explored [11, 26]. Studies on borazines have centered on their reactions with pyrazole [12] and on approaches to the preparation of precursors to macromolecules and polymers based on B–N units. In this context the development of a convenient preparation of unsymmetrically B–substituted borazines seems to be most noteworthy [33, 34]; it ultimately led to the preparation and characterization of various types of polyborazines [34, 36]. The preparation of unsymmetrically N–substituted borazines has also been pursued [37]. Finally, some B–N–C heterocycles have been studied [21, 22, 25, 26].

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*Relevant technical reports are cited in brackets.

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1 (April 1984): Studies on B–(Pyrazol–1′–yl)pyrazaboles

2 (July 1984): The Bromination of Pyrazabole

3 (November 1984): Syntheses and Reactions of Pyrazaboles

4 (November 1984): Structures of Three Pyrazaboles: 1,3,5,7–Tetramethylpyrazabole, 4,8–Bis(pyrazol–1′–yl)pyrazabole; 4,4,8,8–Tetrakis(pyrazol–1′–yl)pyrazabole

5 (December 1984): Boron Derivatives of 3–Methylpyrazole

6 (January 1985): Theoretical Studies on N–Bonded Pyrazole Derivatives of Boron

7 (March 1985): Polyboron Spiro–Cations Based on Bridging Dipyrazol–1–ylboryl Units

8 (June 1985): The Dimethylamino–tris(1–pyrazolyl)borate(1–) Ion, A New Hybrid Poly(1–pyrazolyl)borate Ligand

9 (July 1985): Triply–Bridged Diboron Species of the Pyrazabole Type

10 (October 1985): Polynuclear Pyrazolyl–Bridged Spiro Species Containing Boron and Metal Centers

11 (January 1986): Reactions of Boroxines and Diboroxanes with Pyrazole

12 (August 1986): Reactions of Borazines with Pyrazole and Some Related Studies

13 (September 1986): Chemical Behavior and Structure of Triply–Bridged Pyarzaboles of the Type $RB(\mu\text{–}pz)_2(\mu\text{–}OBRO)BR$

14 (January 1987): Studies on B–Halogenated Pyrazaboles

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16 (July 1987): Hydrazine Complexes of B–Triorganylboroxins

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22 (March 1989): Reactions of Some Boron Heterocycles with Pyrazole

23 (March 1989): Complexes of B–Triethylboroxin with Ethylenediamine and Derivatives Thereof

24 (July 1989): Triazaboles and Related Triazole Derivatives of Boron

25 (July 1989): New Boron–Nitrogen Analogues of Uracil Derivatives

26 (September 1989): Preparation and Reactions of Di(aminoboryl) Oxides

27 (October 1989): Pyrazole Derivatives of 9–Borabicyclo[3.3.1]nonane

28 (April 1990): Pyrazole Derivatives of Three–Coordinated Boranes

29 (August 1990): N–Triazolylboranes

30 (September 1990): Boron Derivatives of 3–Ferrocenylpyrazole

31 (October 1990): N–Bonded Triazole Derivatives of Boron: *cyclo*–Tetra(triazolylboranes)

32 (October 1990): Tin(II) Poly(1–pyrazolyl)borates

33 (March 1991): Convenient Synthesis of Unsymmetrically B–Substituted Borazines

34 (May 1991): Preparation of Unsymmetrically B–Substituted Borazines and Characterization of Tris(4,6–diethylborazin–2–yl)amine

35 (June 1991): Diorganyltin(IV) Di–Poly(1–pyrazolyl)borates and Related Species

36 (Auguat 1991): Preparation and Characterization of Some Polyborazines

37 (September 1991): Studies on 1–Trimethylsilyl–2,4,6–triethylborazine and Related Species

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